IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Joakim O. Blanch, et al.	§	
Serial No.:	10/027,749	§	Group Art Unit: 2862
Filed:	12/21/01	§	Examiner: Le, Toan M.
For:	Acoustic Logging Apparatus And Method for Anisotropic Earth Formations	§	

DECLARATION OF DR. ARTHUR C.H. CHENG

1. My name is Arthur C.H. Cheng. I am over 18 years of age, have never convicted of a felony, and am competent to make this Declaration.

2. I hold a Sc.D. in Geophysics from Massachusetts Institute of Technology, and Bachelor of Science in Engineering Physics from Cornell University. As of December 21, 2001, I had twenty-three years experience designing, building and testing downhole acoustic logging tools.

3. The ordinary level of experience for persons responsible for designing, building and testing acoustic logging tools is at least a Ph.D. and five years experience.

4. I was asked and agreed to read U.S. Patent application Serial No. 10/027,749 titled "Acoustic Logging Apparatus and Method for Anisotropic Earth Formations" (hereinafter "the Application"). While I was told my assistance was needed in responding to the United States Patent and Trademark Office (hereinafter the PTO), I was not told the specifics of the position of the PTO regarding the Application, or what my role would be in responding. After reviewing in detail the specification and drawings, only then was I asked whether, based on my education and experience as of December 21, 2001, I could make and use the technology described in the Application.

5. Based on my education and experience as of December 21, 2001, and the disclosure of the Application, I could design and make an operable acoustic logging system as described in the Application with little experimentation.

6. A first specific example of a location in the specification that I believe would teach one of ordinary skill in the art to make and use the invention is in paragraph [0024], where the assumed transfer function is described. It is stated that the transfer function can be "relatively simple, taking into account only the finite speed at which the acoustic signals propagate and the strike angle... ." This clearly means that the transfer function can be a simple "travel time equals distance divided by speed" calculation. The description of the strike angle, in simple geometry, is given in paragraph [0025]. The specification further states, in the final sentence of paragraph [0025], that the "preferred estimated transfer function takes into account only the propagation speed (slowness) of the acoustic energy in the formation and the strike angle of the anisotropy." This means that the preferred transfer function is the very simple one I just stated.

7. A second example of a location in the specification that I believe would teach one of ordinary skill in the art how to make and use the invention is a phase in paragraph [0024]. "The transfer function ... may be very complex, to include estimations of attenuation of the transmitted signal in the formation, paths of travel of the acoustic signals, the many different propagation modes within the formation... ." This means that one can also use a more complex transfer function, which includes the borehole geometry and the other properties stated. There have been many publications in the literature describing how to calculate such a transfer function, the earliest going back to a 1952 paper by M.A. Biot (Propagation of elastic waves in a cylindrical bore containing a fluid, J. Applied Physics, v. 23, p. 997). I personally have written many scientific papers on the subject (e.g. Elastic wave propagation in a fluid-filled borehole and synthetic acoustic logs, by C.H. Cheng and M.N. Toksoz, in Geophysics, v. 46, p. 1042, 1981), including a textbook (Acoustic waves in boreholes, by F.L. Paillet and C.H. Cheng, CRC Press, 1991, ISBN number 0-8493-8890-2, Library of Congress Card number 91-26673). Thus a person of ordinary skill in the art would know how to calculate such a more complex transfer function.

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Arthur C.H. Cheng

Dated: May 1, 2003.